

CLAIMS

WHAT IS CLAIMED IS:

1. A thermoplastic elastomer prepared from a random polytrimethylene ether ester and a polymer selected from the group consisting of polyesters, polyamides, polyurethanes and polyurethane ureas, wherein the random polytrimethylene ether ester is prepared by polycondensation of 1,3-propanediol reactant and about 10 to about 0.1 mole % of aliphatic or aromatic diacid or diester.
2. The thermoplastic elastomer of claim 1 comprising a soft segment from the random polytrimethylene ether ester and alkylene ester hard segment.
3. The thermoplastic elastomer of claim 2, wherein the alkylene ester hard segment is a tetramethylene ester hard segment.
4. The thermoplastic elastomer of claim 2, wherein the alkylene ester hard segment is a trimethylene ester hard segment.
5. The thermoplastic elastomer of claim 1 which is a polytrimethylene ether ester amide comprising a soft segment from the random polytrimethylene ether ester and a polyamide hard segment.
6. The thermoplastic elastomer of claim 1 which is a polyurethane or polyurethane urea elastomer prepared from (a) the random polytrimethylene ether ester, (b) diisocyanate and (c) diol or diamine chain extender.
7. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared by polycondensation of 1,3-propanediol reactant and about 10 to about 0.1 mole % of aliphatic or aromatic diacid or diester.
8. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared by polycondensation of 1,3-propanediol reactant and about 10 to about 0.1 mole % of aliphatic or aromatic diacid.
9. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 90 to about 99.9 mole % of the 1,3-propanediol reactant and the about 10 to about 0.1 mole % of aliphatic or aromatic diacid.

10. The thermoplastic elastomer of claim 7 wherein the random polytrimethylene ether ester is prepared from about 80 to about 99.9 mole % of the 1,3-propanediol reactant, the about 10 to about 0.1 mole % of aliphatic or aromatic diacid, and up to about 10 mole % of diol reactant

5 other than 1,3-propanediol reactant.

11. The thermoplastic elastomer of claim 1 wherein the 1,3-propanediol reactant is selected from the group consisting of 1,3-propanediol, and oligomers and prepolymers of 1,3-propanediol having a degree of polymerization of 2 to 9, and mixtures thereof.

10 12. The thermoplastic elastomer of claim 1 wherein the 1,3-propanediol reactant is 1,3-propanediol.

13. The thermoplastic elastomer wherein the 1,3-propanediol reactant is selected from the group consisting of prepolymers of 1,3-propanediol having a degree of polymerization of 4 to 9 and mixtures thereof.

15 14. The thermoplastic elastomer of claim 1 wherein the aliphatic or aromatic diacid or ester is selected from the group consisting of aromatic dicarboxylic acids and esters, and combinations thereof.

20 15. The thermoplastic elastomer of claim 8 wherein the aliphatic or aromatic diacid is selected from the group consisting of aromatic dicarboxylic acids and combinations thereof.

25 16. The thermoplastic elastomer of claim 8 wherein the aliphatic or aromatic diacid is an aromatic diacid selected from the group consisting of terephthalic acid, isophthalic acid, bibenzoic acid, naphthalic acid, bis(p-carboxyphenyl)methane, 1,5-naphthalene dicarboxylic acid, 2,6-naphthalene dicarboxylic acid, 2,7-naphthalene dicarboxylic acid, 4,4'-sulfonyl dibenzoic acid, p-(hydroxyethoxy)benzoic acid, and combinations thereof.

30 17. The thermoplastic elastomer of claim 8 wherein the aliphatic or aromatic diacid is terephthalic acid.

18. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 95 to 99.5 mole % of the 1,3-propanediol reactant and about 5 to about 0.5 mole % of the aliphatic or aromatic diacid.

19. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 97.5 to 99 mole % of the 1,3-propanediol reactant and about 2.5 to about 1 mole % of the aliphatic or aromatic diacid.

5 20. The thermoplastic elastomer of claim 1 wherein the random polytrimethylene ether ester is prepared from about 87.5 to about 99 mole % of the 1,3-propanediol reactant, about 2.5 to about 1 mole % of aliphatic or aromatic diacid or diester, and up to about 10 mole % of diol other than 1,3-propanediol reactant.

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